

## Master Thesis at ForWind in Wind Energy Meteorology

Topic

Statistical downscaling of Reanalyses utilizing the atmospheric model COSMO-DE  
for wind and solar energy application

When designing Europe's future power supply system with very high shares of Renewable Energy Sources (RES), namely wind and solar power, historic weather data is used to simulate the production of wind energy and solar energy. Gridded weather data is available from various Reanalyses projects, although the horizontal resolution is relatively coarse compared to state-of-the-art mesoscale Numerical Weather Prediction (NWP) models. The COSMO-EU model of the German Weather Service (DWD) has a resolution of 7km. Within the Master Thesis statistical methods will be developed to downscale Reanalyses of approximately 40km to 7km using COSMO-EU as a reference. Thus it is possible to use the long time Reanalyses time series (up to 50 years) to capture interannual and interdecadal variability in the production of wind and solar power. Statistical downscaling is able to account for i) orographic and channeling effects, ii) land/sea difference, and iii) inhomogeneous land type that are not resolved in the Reanalysis, The downscaling error in terms of wind and solar resource, but also in terms of wind power and solar power (Photovoltaic and Concentrated Solar Power CSP) will be quantified by season and region.

The use of ForWind's new super-computer is envisaged for this master thesis.

### Requirements

- enthusiasm for meteorology and/or wind energy; scientific and technical work and efficient handling of huge data volumes
- good knowledge in statistics, data analysis and programming (preferably Fortran/C and/or IDL) is essential

### Contact

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Group: Large-Scale Wind Power Simulation and Prediction